

1. A machine for slitting a metal sheet comprising:
 - a frame;
 - an upper drive shaft assembly mounted for rotation in the frame;
 - a lower drive shaft assembly mounted for rotation in the frame;
 - 5 a drive motor operably coupled to the upper and the lower drive shaft assemblies for rotation of the drive shaft assemblies;
 - a plurality of knife holder assemblies supported by the frame in pairs for movement along the drive shaft assemblies such that a first knife holder assembly is supported for movement along the upper drive shaft
 - 10 assembly and a second knife holder assembly is supported for movement along the lower drive shaft assembly;
 - a plurality of rotary knives each being mounted in one of the knife holder assemblies and driven by one of the upper and lower drive shaft assemblies;
 - 15 wherein the knives of the first and second knife holder assemblies cooperate to slit the metal sheet passing through a nip between the knives of the respective knife holder assemblies;
 - a knife holder position adjustment system operably coupled to each of the knife holder assemblies for movement of the knife holder assembly
 - 20 along the respective drive shaft assembly; and
 - a programmable controller operably coupled to the knife holder position adjustment system to position the knife holder assemblies along the respective drive shaft assemblies.

5

5

coupled to one of the threaded shafts such that rotation of at least a portion of each knife holder assembly relative to the associated threaded shaft moves the knife holder assembly along the associated drive shaft assembly.

5

and

10

5. The machine of claim 1 wherein a position of each of the knife holder assemblies is adjustable by the knife holder position adjustment system independent from each of the other knife holder assemblies.

```
5   frame;
```

10

15

20

a lower threaded shaft mounted in the lower frame;

5

10

wherein actuation of each positioning motor by the programmable controller rotates the associated ball nut for movement of the associated knife holder assembly along the associated drive shaft assembly; and

wherein a position of each of the knife holder assemblies is adjustable independent from each of the other knife holder assemblies.

7. A machine for slitting a metal sheet comprising:

a frame;

an upper drive shaft assembly mounted for rotation in the frame;

a lower drive shaft assembly mounted for rotation in the frame;

5 each of the drive shaft assemblies comprising a plurality of drive shaft sections each being coupled to an adjacent drive shaft section for rotation in the frame;

a drive motor operably coupled to the upper and the lower drive shaft assemblies for rotation of the drive shaft assemblies;

10 a plurality of knife holder assemblies supported by the frame in pairs for movement along the drive shaft assemblies such that a first knife holder assembly is supported for movement along the upper drive shaft assembly and a second knife holder assembly is supported for movement along the lower drive shaft assembly; and

15 a plurality of rotary knives each being mounted in one of the knife holder assemblies and driven by one of the upper and lower drive shaft assemblies;

wherein the knives of the first and second knife holder assemblies cooperate to slit the metal sheet passing through a nip between the knives of the respective knife holder assemblies;

20

wherein the adjacent drive shaft sections of each drive shaft assembly are adapted to be selectively repositioned relative to one another for servicing the machine.

FOOT " 9E68001

8. The machine of claim 7 further comprising:
a coupling mechanism releasably coupling the adjacent drive shaft sections together.
9. The machine of claim 8 wherein the coupling mechanism is a coupling, each drive shaft section further comprising:
a spindle projecting axially from the drive shaft section, the coupling releasably connecting the spindles on adjacent drive shaft sections.
10. The machine of claim 7 further comprising:
a drive shaft uncoupling mechanism for a user to selectively uncouple the adjacent drive shaft sections.
11. The machine of claim 10 wherein the drive shaft uncoupling mechanism further comprises:
a screw operably coupled to at least one of the drive shaft sections;
5 whereupon rotation of the screw axially withdraws the drive shaft section from the adjacent drive shaft section.

12. The machine of claim 7 wherein the adjacent drive shaft sections are uncoupled from one another for servicing of one of the knife holder assemblies positioned proximate a juncture of the adjacent drive shaft sections.

10003935 110301

13. A machine for slitting a metal sheet comprising:
- a frame;
 - an upper drive shaft assembly mounted for rotation in the frame;
 - a lower drive shaft assembly mounted for rotation in the frame;
 - 5 each of the drive shaft assemblies comprising a plurality of drive shaft sections each being releasably coupled to an adjacent drive shaft section for rotation in the frame;
 - a spindle projecting axially from each of the drive shaft sections;
 - a coupling releasably connecting the spindles on adjacent drive
 - 10 shaft sections together;
 - a drive motor operably coupled to the upper and the lower drive shaft assemblies for rotation of the drive shaft assemblies;
 - a plurality of knife holder assemblies supported by the frame in pairs for movement along the drive shaft assemblies such that a first knife
 - 15 holder assembly is supported for movement along the upper drive shaft assembly and a second knife holder assembly is supported for movement along the lower drive shaft assembly;
 - a plurality of rotary knives each being mounted in one of the knife holder assemblies and driven by one of the upper and lower drive shaft
 - 20 assemblies;
 - wherein the knives of the first and second knife holder assemblies cooperate to slit the metal sheet passing through a nip between the knives of the respective knife holder assemblies;
 - wherein the adjacent drive shaft sections of each drive shaft
 - 25 assembly are adapted to be selectively uncoupled from one another for

a screw operably coupled to at least one of the drive shaft sections;

30 whereupon rotation of the screw axially withdraws the drive shaft
section from the adjacent drive shaft section.

5

each of the drive shaft assemblies comprising a plurality of drive

10

servicing the machine;

shaft assemblies for rotation of the drive shaft assemblies;

15

along the lower drive shaft assembly;

holder assemblies and driven by one of the upper and lower drive shaft

20

the respective knife holder assemblies;

a knife holder position adjustment system operably coupled to each of the knife holder assemblies for movement of the knife holder assembly along the respective drive shaft assembly; and

- 5 a programmable controller operably coupled to the knife holder position adjustment system to position the knife holder assemblies along the respective drive shaft assemblies.

```
5   frame;
```

10

15

20

wherein the upper frame is movable relative to the lower frame to adjust relative vertical positioning of the knives of the first and second knife holder assemblies for slitting metal sheets of differing thicknesses.

16. The machine of claim 15 further comprising:
a frame adjustment mechanism for adjusting relative vertical positioning of the knives of the first and second knife holder assemblies in a direction generally perpendicular to the axes of the drive shaft assemblies.
17. The machine of claim 16 wherein the frame adjustment mechanism further comprises:
a pair of jack screws each mounted between the upper and lower frames.
18. The machine of claim 17 further comprising:
an actuator coupled to each of the jack screws for simultaneous adjustment of the jack screws.
19. The machine of claim 15 wherein movement of the upper frame relative to the lower frame maintains the frames generally parallel relative to each other.
20. The machine of claim 19 wherein the upper frame is pivotally coupled to the lower frame.

25

an actuator coupled to each of the jack screws for simultaneous adjustment of the jack screws.

22. A machine for slitting a metal sheet comprising:

an upper frame;

a lower frame coupled to the upper frame;

an upper drive shaft assembly mounted for rotation in the upper

5 frame;

a lower drive shaft assembly mounted for rotation in the lower

frame;

a drive motor operably coupled to the upper and the lower drive
shaft assemblies for rotation of the drive shaft assemblies;

10 a plurality of knife holder assemblies supported by the upper and
lower frames in pairs on the drive shaft assemblies such that a first knife holder
assembly is supported for movement along the upper drive shaft assembly and
a second knife holder assembly is supported for movement along the lower
drive shaft assembly;

15 a plurality of rotary knives each being mounted in one of the knife
holder assemblies and driven by one of the upper and lower drive shaft
assemblies;

wherein the knives of the first and second knife holder assemblies
cooperate to slit the metal sheet passing through a nip between the knives of

20 the respective knife holder assemblies;

a knife holder position adjustment system operably coupled to
each of the knife holder assemblies for movement of the knife holder assembly
along the respective drive shaft assembly; and

wherein the upper frame is movable relative to the lower frame to
5 adjust relative vertical positioning of the knives of the first and second knife
holder assemblies for slitting metal sheets of differing thicknesses.

5

frame;

frame;

10

for rotation in the associated frame;

shaft a

15

lower t

such th

for mo

20

holder

assem

coope

cooperate to slit the metal sheet passing through a nip between the knives of

the respective knife holder assemblies;

wherein the upper frame is movable relative to the lower frame to
5 adjust relative vertical positioning of the knives of the first and second knife
holder assemblies for slitting metal sheets of differing thicknesses.

24. A machine for slitting a metal sheet comprising:

an upper frame;

a lower frame coupled to the upper frame;

an upper drive shaft assembly mounted for rotation in the upper

5 frame;

a lower drive shaft assembly mounted for rotation in the lower

frame;

each of the drive shaft assemblies comprising a plurality of drive

shaft sections each being releasably coupled to an adjacent drive shaft section

10 for rotation in the respective frame;

wherein the adjacent drive shaft sections of each drive shaft

assembly are adapted to be selectively uncoupled from one another for

servicing the machine;

a drive motor operably coupled to the upper and the lower drive

15 shaft assemblies for rotation of the drive shaft assemblies;

a plurality of knife holder assemblies supported by the upper and

lower frames in pairs for movement along the drive shaft assemblies such that

a first knife holder assembly is supported for movement along the upper drive

shaft assembly and a second knife holder assembly is supported for movement

20 along the lower drive shaft assembly;

a plurality of rotary knives each being mounted in one of the knife

holder assemblies and driven by one of the upper and lower drive shaft

assemblies;

wherein the upper frame is movable relative to the lower frame to
5 adjust relative vertical positioning of the knives of the first and second drive
shaft assemblies for slitting metal sheets of differing thicknesses;

10 a programmable controller operably coupled to the knife holder
position adjustment system to position the knife holder assemblies along the
respective drive shaft assemblies.

25. A machine for slitting a metal sheet comprising:
- a frame;
 - an upper drive shaft assembly mounted for rotation in the frame;
 - a lower drive shaft assembly mounted for rotation in the frame;
 - 5 a drive motor operably coupled to the upper and the lower drive shaft assemblies for rotation of the drive shaft assemblies;
 - a plurality of knife holder assemblies supported by the frame in pairs for movement along the drive shaft assemblies such that a first knife holder assembly is supported for movement along the upper drive shaft
 - 10 assembly and a second knife holder assembly is supported for movement along the lower drive shaft assembly;
 - a plurality of rotary knives each being mounted in one of the knife holder assemblies and driven by one of the upper and lower drive shaft assemblies;
 - 15 wherein the knives of the first and second knife holder assemblies cooperate to slit the metal sheet passing through a nip between the knives of the respective knife holder assemblies;
 - knife holder position adjustment means for moving each of the knife holder assemblies along the respective drive shaft assembly; and
 - 20 controller means for controlling the knife holder position adjustment means.

26. A machine for slitting a metal sheet comprising:
- an upper frame;
 - a lower frame coupled to the upper frame;
 - an upper drive shaft assembly mounted for rotation in the upper
- 5 frame;
- a lower drive shaft assembly mounted for rotation in the lower
- frame;
- a drive motor operably coupled to the upper and the lower drive
- shaft assemblies for rotation of the drive shaft assemblies;
- 10 a plurality of knife holder assemblies supported by the upper and
- lower frames in pairs supported for movement along the drive shaft assemblies
- such that a first knife holder assembly is supported for movement along the
- upper drive shaft assembly and a second knife holder assembly is supported
- for movement along the lower drive shaft assembly; and
- 15 a plurality of rotary knives each being mounted in one of the knife
- holder assemblies and driven by one of the upper and lower drive shaft
- assemblies;
- wherein the knives of the first and second knife holder assemblies
- cooperate to slit the metal sheet passing through a nip between the knives of
- 20 the respective knife holder assemblies;
- frame moving means for moving the upper frame relative to the
- lower frame to adjust a relative vertical positioning of the knives of the first and
- second knife holder assemblies for slitting metal sheets of differing thicknesses.

27. A method of slitting a metal sheet comprising the steps of:

inputting a first set of parameters of the metal sheet into an electronic input device;

5 inputting a second set of parameters of mullets to be slit from the metal sheet into the electronic input device;

processing the first and second set of parameters in a computer to generate a configuration for a plurality of knife blades; and

automatically positioning the plurality of knife blades on a slitting machine according to the configuration.

10003936-10001
10001-10001

5

10

servicing the knife holder assembly; and

moving the first section relative to the second section into an operational arrangement for the slitting machine.

29. A method of operating a slitting machine to slit metal sheets of differing thicknesses, the method comprising the steps of:

passing a first metal sheet of a first thickness into a nip between a plurality of rotating knife blades driven by generally parallel upper and lower
5 shafts mounted for rotation in upper and lower portions of a machine frame, respectively;

slitting the first metal sheet with the knife blades into a first set of
mults;

moving the upper shaft relative to the lower shaft and thereby
10 changing relative vertical positioning of the knives driven by the upper and lower shafts;

wherein the upper shaft remains generally parallel to the lower shaft during the moving of the upper shaft relative to the lower shaft;

passing a second metal sheet of a second thickness into the nip
15 between the knife blades, the second thickness being different than the first thickness; and

slitting the second metal sheet with the knife blades into a second set of mults.